

Serial No.: 10/565,195
Docket No.: 102-1647T
Amendment dated November 25, 2011
Reply to the Office Action of July 25, 2011

Amendments to the Claims

The listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A photodetector for, when light emitted from a two-wavelength light source is divided into at least three light components to be reflected by an optical recording medium, detecting the reflected light components, the photodetector comprising:

a first detector divided into no more than eight sections detecting the at least three light components reflected by the optical recording medium to convert the light components into a first set of electrical signals;

a first calculating portion calculating a first tracking error signal from the first set of electrical signals converted by the first detector by a differential push-pull method;

a second calculating portion calculating a first focusing error signal by an astigmatism method and calculating a second tracking error signal by a differential phase detection method from the first set of electrical signals converted by the first detector;

a second detector divided into four sections detecting the at least three light components reflected by the optical recording medium to convert the at least three light components into a second set of electrical signals; and

a third calculating portion calculating a second focusing error signal by the astigmatism method and calculating a third tracking error signal by the differential phase detection method from the second set of electrical signals converted by the second detector;

wherein the first detector includes:

a first central sensor having a region divided vertically and horizontally into four sub regions detecting a central light component among the at least three light components reflected by the optical recording medium to convert the central light component into the first set of electrical signals;

a first peripheral sensor having a region divided vertically or horizontally into two sub regions detecting a first peripheral light component among the at least three light components reflected by the optical recording medium to convert the first peripheral light

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component into the first set of electrical signals; and
a second peripheral sensor having a region divided vertically or horizontally into
two sub regions detecting a second peripheral light component among the at least three
light components detected by the optical recording medium to convert the second
peripheral light component into the first set of electrical signals.

2. (Canceled)

3. (Original) The photodetector according to claim 1, wherein the optical recording medium is one among a DVD-R, a DVD+RW, a DVD-RW, and a CD.

4. (Previously Presented) The photodetector according to claim 3, further comprising a switching portion selectively outputting either the first tracking error signal or the second tracking error signal in accordance with a type of optical recording medium.

5. (Original) The photodetector according to claim 4, wherein the switching portion selectively outputs the first tracking error signal calculated by the first calculating portion when the optical recording medium is one among the DVD-R, the DVD+RW, and the DVD-RW, and

wherein the switching portion selectively outputs the second tracking error signal calculated by the second calculating portion when the optical recording medium is the DVD ROM.

6. (Original) The photodetector according to claim 3, wherein the third calculating portion calculates the second focusing error signal and the third tracking error signal when the optical recording medium is the CD.

7. (Previously Presented) The photodetector according to claim 1, wherein the first

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detector is a DVD sensor and the second detector is a CD sensor.

8. (Previously Presented) The photodetector according to claim 7, wherein the DVD sensor includes a first central sensor and first and second peripheral sensors.

9. (Previously Presented) The photodetector according to claim 8, wherein the first central sensor is divided into four regions and the first and second peripheral sensors are each divided into two regions.

10. (Previously Presented) The photodetector according to claim 9, wherein a 0 order beam is incident on the first central sensor, a +1 order beam is incident on the first peripheral sensor and a -1 order beam is incident on the second peripheral sensor.

11. (Previously Presented) The photodetector according to claim 7, wherein the DVD sensor generates the first tracking error signal using the differential push-pull method when the optical recording medium is a DVD-R or a DVD±RW and the DVD sensor generates the second tracking error signal using the differential phase detection method when the optical recording medium is a DVD-ROM.

12. (Previously Presented) The photodetector according to claim 11, wherein the first tracking error signal is used for tracking a servo of an optical pick-up when the recording medium is a DVD-R or a DVD±RW.

13. (Currently Amended) A photodetector detecting reflected light components from an optical recording medium, the photodetector comprising:
a first detector divided into no more than eight sections detecting the reflected light

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components from the optical recording medium and converting the reflected light components into a first set of electrical signals;

a first calculating portion calculating a first tracking error signal from the first set of electrical signals converted by the first detector using a differential push-pull method;

a second calculating portion calculating a first focusing error signal and a second tracking error signal from the first set of electrical signals converted by the first detector using an astigmatism method and a differential phase detection method, respectively;

a second detector detecting the reflected light components from the optical recording medium and converting the reflected light components into a second set of electrical signals; and

a third calculating portion calculating a second focusing error signal and a third tracking error signal from the second set of electrical signals converted by the second detector using the astigmatism method and the differential phase detection method, respectively,

wherein the first detector includes:

a first central sensor having a region divided vertically and horizontally into four sub regions detecting a central light component among the at least three light components reflected by the optical recording medium to convert the central light component into the first set of electrical signals;

a first peripheral sensor having a region divided vertically or horizontally into two sub regions detecting a first peripheral light component among the at least three light components reflected by the optical recording medium to convert the first peripheral light component into the first set of electrical signals; and

a second peripheral sensor having a region divided vertically or horizontally into two sub regions detecting a second peripheral light component among the at least three light components detected by the optical recording medium to convert the second peripheral light component into the first set of electrical signals.

14. (Previously Presented) The photodetector according to claim 13, wherein the first detector is divided into eight detecting regions and the second detector is divided into four detecting regions.

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15. (Previously Presented) The photodetector according to claim 13, wherein the first detector is a DVD sensor and the second detector is a CD sensor.

16. (Previously Presented) The photodetector according to claim 15, wherein the DVD sensor includes a first central sensor and first and second peripheral sensors.

17. (Previously Presented) The photodetector according to claim 16, wherein the first central sensor is divided into four regions and the first and second peripheral sensors are each divided into two regions.

Claims 18-20. (Canceled)